IN THE CLAIMS

Please amend claims 57-58 and 62-63 as set forth below.

1. (Previously Presented) A method of modeling circulation in a living subject, such method comprising the steps of:

simulating the fluid dynamics of an arterial network, wherein the simulation models blood flow through a plurality of arterial segments including one or more terminal efferent vessels;

adapting the simulation to substantially conform to a specific arterial anatomy of the living subject;

forcing the simulation with a forcing function made up of one or more flow-time or pressure-time signatures;

calculating ~~a~~ blood flows in the arterial network based upon the forced simulation;

measuring a blood flow in the living subject;

correcting the simulation based on the measured and calculated blood flows;

modifying the simulation to model a particular interventional procedure; and,

calculating a post-procedure blood flow in a selected arterial segment using the modified simulation in order to predict an outcome of the actual interventional procedure performed in the living subject.

2. (Previously Presented) The method of modeling as in claim 1 wherein the simulated arterial network includes the Circle of Willis.

3-4 (Cancelled)

5. (Previously Presented) The method of modeling as in claim 1 wherein the step of adapting the simulation to substantially conform to the living subject's anatomy further comprises conforming a vessel of the simulation with a corresponding vessel in an image of the living subject.

6. (Previously Presented) The method of modeling as in claim 5 wherein the step of adapting the simulation to substantially conform to the living subject's anatomy further comprises measuring a diameter of the corresponding vessel in the image of the living subject.

7. (Previously Presented) The method of modeling as in claim 6 further comprising localizing the corresponding vessel in three-dimensional space and tracing a boundary into adjacent areas in three-dimensional space to locate respective ends of the corresponding vessel.

8. (Cancelled)

9. (Previously Presented) The method of modeling as in claim 1 wherein the simulation of the arterial network includes a one-dimensional, explicit, finite difference algorithm based upon a conservation of mass equation, a Navier-Stokes momentum equation, and an equation of state relating local pressure to local artery size.

10. (Previously Presented) The method of modeling as in claim 1 wherein the simulation is forced with a flow measurement obtained from the living subject.

11. (Previously Presented) The method of modeling as in claim 1 wherein the simulation is forced with a pressure-time signature obtained from a prototypical measurement.

12. (Previously Presented) Apparatus for modeling circulation within a living subject, such apparatus comprising:

a computerized model of an arterial network made up of a plurality of arterial segments including one or more terminal efferent vessels, wherein the apparatus includes means for calculating blood flows in the arterial network when the model is forced with a forcing function;

means for adapting the model of the arterial network to substantially conform to a specific arterial anatomy of the living subject;

means for measuring a blood flow in the living subject;

means for correcting the model based upon the calculated and measured flows;

means for modifying the model to reflect a particular interventional procedure; and,

means for calculating a post-procedure blood flow in a selected arterial segment using the modified model in order to predict an outcome of the actual interventional procedure performed in the living subject

13. (Previously Presented) The apparatus for modeling as in claim 12 wherein the circulation model further comprises the Circle of Willis.

14. (Cancelled)

15. (Previously Presented) The apparatus for modeling as in claim 12 wherein the means for measuring blood flow is a phase contrast magnetic resonance angiography flow measurement system.

16. (Previously Presented) The apparatus for modeling as in claim 15 wherein the means for adapting the model to substantially conform to the living subject's anatomy further comprises means for selecting a vessel of the model and a corresponding vessel in an image of the living subject.

17. (Previously Presented) The apparatus for modeling as in claim 16 wherein the means for adapting the model to substantially conform to the living subject's anatomy further comprises means for measuring a diameter of the corresponding vessel.

18. (Previously Presented) The apparatus for modeling as in claim 17 further comprising means for localizing the corresponding vessel in three-dimensional space and tracing a boundary into adjacent areas in three-dimensional space to locate respective ends of the corresponding vessel.

19. (Cancelled)

20. (Previously Presented) The apparatus for modeling as in claim 12 wherein the computerized simulation model includes a one-dimensional, explicit, finite difference algorithm based upon a conservation of mass equation, a Navier-Stokes momentum equation, and an equation of state relating local pressure to local artery size.

21. (Previously Presented) The apparatus for modeling as in claim 12 wherein the model is forced with a flow measurement obtained from the living subject.

22. (Previously Presented) The apparatus for modeling as in claim 12 wherein the model is forced with a pressure-time signature obtained from a prototypical measurement.

23-51 (Cancelled)

52. (Previously Presented) The method of claim 1 further comprising the step of obtaining a flow measurement in the living subject by phase contrast magnetic resonance angiography.

53. (Previously Presented) The method of claim 1 further comprising the step of obtaining a flow measurement in the living subject by a Doppler flow measurement.

54. (Previously Presented) The apparatus for modeling as in claim 12 wherein the means for measuring blood flow is a Doppler flow measurement device.

55. (Cancelled)

56. (Previously Presented) The method of claim 1 wherein the arterial network is divided into a plurality of sectors, wherein each sector is terminated by a terminal efferent vessel and has

a primary input vessel, and further wherein the terminal efferent vessels are modeled as terminal efferent resistances, the method further comprising:

(a) measuring blood flows in the living subject corresponding to the primary input flows of the sectors;

(b) adjusting the terminal efferent resistances for each sector in a manner which tends to make the calculated flow in the terminal efferent vessel match the measured primary input flow for each such sector.

57. (Currently Amended) The method of claim 56 further comprising repeating ~~steps a and b~~ the calculation of blood flows in the terminal efferent vessels and adjustment of terminal efferent resistances a selected number of times.

58. (Currently Amended) The method of claim 56 further comprising repeating ~~steps a and b~~ the calculation of blood flows in the terminal efferent vessels and adjustment of terminal efferent resistances until the differences between the calculated terminal efferent flows and the corresponding measured primary input flows for each sector are within specified limit values.

59. (Previously Presented) The method of claim 56 wherein the terminal efferent resistance of a sector is adjusted by multiplying the terminal efferent resistance by the ratio of the measured primary input flow to the calculated terminal efferent flow.

60. (Previously Presented) The method of claim 56 wherein one or more sectors has one or more secondary input or output vessels and further comprising:

calculating flows through the secondary input and output vessels; and,

adjusting the terminal efferent resistances for each sector in a manner which tends to make the calculated flow in the terminal efferent vessel match the measured primary input flow adjusted for the calculated flows in the secondary input and output vessels.

61. (Previously Presented) A system for modeling circulation within a living subject, comprising:

a computerized model of an arterial network made up of a plurality of arterial segments including one or more terminal efferent vessels, wherein the system includes means for calculating blood flows in the arterial network when the model is forced with a forcing function;

means for adapting the model of the arterial network to substantially conform to a specific arterial anatomy of the living subject;

wherein the arterial network is divided into a plurality of sectors, wherein each sector is terminated by a terminal efferent vessel and has a primary input vessel, and further wherein the terminal efferent vessels are modeled as terminal efferent resistances;

means for measuring blood flows in the living subject corresponding to the primary input flows of the sectors; and

means for adjusting the terminal efferent resistances for each sector in a manner which tends to make the calculated flow in the terminal efferent vessel match the measured primary input flow for each such sector.

62. (Currently Amended) The system of claim 61 further comprising means for iteratively ~~measuring blood flows in the living subject corresponding to the primary input flows of the sectors~~ calculating blood flows in the terminal efferent vessel of each sector and adjusting the terminal efferent resistances for each sector in a manner which tends to make the calculated flow in the terminal efferent vessel match the measured primary input flow for each such sector..

63. (Currently Amended) The system of claim 61 further comprising means for iteratively ~~measuring blood flows in the living subject corresponding to the primary input flows of the sectors~~ calculating blood flows in the terminal efferent vessel of each sector and adjusting the terminal efferent resistances for each sector in a manner which tends to make the calculated flow in the terminal efferent vessel match the measured primary input flow for each such sector until the differences between the calculated terminal efferent flows and the corresponding measured primary input flows for each sector are within specified limit values.

64. (Previously Presented) The system of claim 61 wherein the terminal efferent resistance of a sector is adjusted by multiplying the terminal efferent resistance by the ratio of the measured primary input flow to the calculated terminal efferent flow.

65. (Previously Presented) The system of claim 61 wherein one or more sectors has one or more secondary input or output vessels and further comprising:

means for calculating flows through the secondary input and output vessels; and,

means for adjusting the terminal efferent resistances for each sector in a manner which tends to make the calculated flow in the terminal efferent vessel match the measured primary input flow adjusted for the calculated flows in the secondary input and output vessels.